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CHAPTER 12

Mapping Modes in Children's Play and Design:

An Action-oriented Approach to Critical Multimodal Analysis

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Amid the bustle of play activist in the housekeeping corner of one kindergarten classroom, Daniel empties the cabinet under the sink in the child-sized kitchen. He removes the white plastic tub that represents the sink and inspects the remaining square hole. Next, he grabs two forks, crawls inside the cabinet, and flips over on his back. Stretching out his legs, he begins to poke the undersides of the metal faucets with the once-forks-now-wrenches. "I'm fixing the sink!" he announced to Ayesha who peers down at him through the hole in the countertop. Immediately, she picks up a nearby fork and reaches down through the sink opening to help him fix the imaginary pipes.

And so, a fork becomes a wrench. As children represent the world through their play, writing, drawing, and construction, they simply and flexibly use whatever "comes to hand" and seems apt for their particular message. Kress (2003b) suggests that children as players and designers strategically emphasize salient features of objects to represent essential aspects of the surrounding reality: Daniel emphasized the lever function of a fork and exploited its potential as a stand-in for a wrench by simply using it to pry at the metal faucets, a transformation bolstered by his sink-fixing supine position and a strip of language, "I'm fixing the sink!" From this four-

word utterance, a twisting gesture, and two legs poking out of a sink cabinet context, Ayeesha immediately recognized the fork as a wrench and took up her own fork/wrench without an explicit explanation. Ayeesha and Daniel along with Mitchell, Jack and Stephen, whom you will meet later in this chapter, were students in a kindergarten classroom that I studied for one school year. In their classroom, I examined how the children's play and design¹ activity transformed materials in ways that shaped their classroom participation and peer power relations. While Ayeesha and Daniel used play to transform plastic forks for their imaginary plumbing scenario, other children used design to transform art materials into paper toys. Mitchell, Jack, and Stephen regularly sat together at the kindergarten art table where they experimented with new ways of handling tools such as scissors and tape and engaged in friendly competitions such as who was the best "draw-er" or who knew the "hardest" math facts. Multimodal analysis of the boys' activity at the art table reveals how making a SpongeBob SquarePants puppet allowed Mitchell to demonstrate his status as a 6-year-old design expert to his tablemates.

Multimodal Analysis

Recently, the field of critical discourse studies has expanded to include "nonverbal (semiotic, multimodal, visual) aspects of interaction and communication" (Wodak & Meyer, 2009, p. 2). Similarly, definitions of literacy have expanded to include embodied and visual ways of producing signs as multimodal literacies comprised of physical actions with bodies, objects, and images that represent and interpret ideas (Kress, 1997; Siegel, 2006; Wohlwend, 2008). van Leeuwen (2008) argues that actions are made meaningful and social through verbal language.

¹ For the purposes of teasing out practices and supporting mediated actions for close analysis in this study, I used the term *design* to refer to practices that produce images and artifacts and the term *writing* to refer to practices that produce printed or handwritten text. However, in lived lives, the boundaries are blurred as texts, images, and artifacts all constitute multimodal texts. I also intend my use of the term *design* to be consistent with social semiotic definitions (Kress, 1996; New London Group, 1996) in which (D)esign refers to playful action that appropriates conventions and reconfigures power relations.

Using a multimodal approach to critical discourse analysis, he analyzes texts and objects through grammars and linguistic structures to see how they represent social actors and their activity, particularly how represented actions, reactions, and interactions constitute power relations.

In this chapter, I take a different tack, using multimodal analysis to understand how actions are made meaningful and social *in situ* rather than in representation, looking at interaction among modes, semiotic practices, and discourses in glocalized contexts. I examine instances of classroom activity to see how modes shape children's literacy learning and participation in early childhood classrooms. Analyzing gaze as a mode reveals the meanings of the ways that students look at classroom materials and at each other, as well as the ways that they are surveilled by the teacher and by the researcher. Gaze turned upon people produces subjectivities, shared gaze among people produces social space, and a research gaze turns subjects into objects of inquiry. In this research, I drew upon the mode of gaze as a way of revealing which modes were most apparent in a classroom literacy event (e.g., gaze, print, and book-handling during a reading lesson) and how the foregrounding of particular modes enforced a set of power relations (teacher/student; reader/nonreader) legitimated by prevailing educational discourses.

Multimodal analysis involves isolating, examining, and explaining an aspect of lived experience to understand how actors exploit available semiotic resources to represent meanings, carry out social practices, and realize power relations². Norris (2004) identifies a range of modes:

- auditory (e.g., speech, music, and sound-effect)
- visual (e.g., print, image, and gaze)

² It is important to remember that although modes are useful heuristics, lived experience is inextricably multimodal (Norris, 2004) and messy in ways that analysis and discourse can only approximate. **Modes are grouped loosely here to suggest a range of experience but modes are not discrete units. Rather, they overlap multiple categories. In Norris's scheme, print is a "disembodied" mode that could be categorized as an environmental mode and also as a visual one.**

- action (e.g., gesture, posture, movement, facial expression, touch, and manipulation of objects including mediated actions with books, writing tools, or art materials)
- environmental (e.g., built environment including dress, layout [of things like furniture in a classroom or street signs at an intersection], proxemics [near/far relationships of bodies and things])

Multimodal analysis emerged as a move away from linguistic analyses that start with transcripts of speech or printed texts. This shift in focus offered fresh perspectives that included modes such as gesture or image, extending discourse studies in education that have primarily featured linguistic “methods of data collection and analysis that ‘strip away’ the multimodal features of contexts and practices. The question of how multimodal representational and communicational resources shape and reshape education does not arise or is not foregrounded” (Jewitt, 2006, p. 2). Multimodal analysis draws upon social semiotics to conduct critical readings that uncover power relations in the strategic arrangement of elements in images, artifacts, and texts. Moving beyond textual analysis, Norris (2004) offers methods for multimodal *interactional* analysis that capture and analyze the tangle of interrelated modal relationships within a segment of lived experience. Although this approach provides rich depiction of experience, it does not critically interrogate interactions for power relations and discourses. A *critical multimodal analysis* of interaction must examine how power circulates among the embodied actions and modal interactions within a moment of lived experience. A critical lens looks deeper and wider, beyond the here-and-now activity, to uncover who decides which actions and modes matter most in a particular event.

The critical multimodal analysis in this chapter considers how particular social practices

foreground some modes over others and how this foregrounding reflects power relations; that is, certain modes “count” more than others when using a social practice that is valued in a particular context. For example, print literacy practices (reading, writing) are privileged in school settings and foreground visual modes (gaze, print) for accessing textual information through primarily paper media (Kress, 1997). In contrast, play practices (pretended pipe-fixing) foreground action modes (gesture, posture, movement, and manipulation of objects) while design practices (drawing, constructing) foreground visual modes (gaze, image) as well as action modes (handling objects such as paintbrushes, markers, scissors, and art materials).

Drawing upon studies in multimodality (Jewitt, 2006; Kress & van Leeuwen, 1996; Jewitt & Kress, 2003; Norris, 2004, 2006) and mediated action (Scollon, 2001; Scollon & Scollon, 2004), I use an activity model (Engestrom, 1999; Leont’ev, 1977; Vygotsky, 1978) to coordinate three theories that support action-oriented multimodal analysis: social semiotics (Jewitt, 2006; Kress, 1997, 2003), mediated discourse (Norris & Jones, 2005; Scollon, 2001; Wertsch, 1991) and practice theory (Bourdieu, 1977). This critical multimodal analysis examines the sign-making and discursive positioning accomplished nonverbally as well as verbally, with particular attention to embodied action and handling of materials in classrooms. It blends social semiotics with activity theory (Jewitt, 2006) to provide a lens that interprets child-made products as signs motivated by available semiotic resources and that situates children’s sign-making within rules, roles, and power relations in learning communities and discourses of schooling. Signs are vestiges of the modes and mediated actions that produced them and reflect each designer’s habitus (Bourdieu, 1977), internalized dispositions and practices engrained in childhood. Thus, a mode-and action-oriented—rather than language-oriented—analysis examines learning as mediated, motivated, and situated activity.

Learning as Mediated, Motivated, and Situated Activity

In a multimodal view of education, learning mediates, and is mediated by, material resources and other social actors according to cultural practices and discursive histories. Learning produces, and is produced by, expanded repertoires of resources for sign-making and increased participation in classroom apprenticeships organized by shared expectations and histories. A multimodal perspective recognizes young children are recognized as designers who talk, act, and create texts, images, and artifacts as intentional messages and who make strategic use of available materials, social spaces, school cultures, and global discourses (Dyson, 2003; Siegel, Kontovourki, Schmier, & Enriquez, 2009; Kress, 1997, 2003; Rowe, 2008; Wohlwend, 2007). Of course, this multimodal perspective on early literacy is itself a discourse (Wohlwend, 2009a). From this perspective, literacies are diverse sets of interrelated semiotic practices for producing and interpreting texts (e.g., reading, writing, play, design) and learning is signaled by changes in participation that are valued and recognized according to prevailing discourses within a community of practice (Lave & Wenger, 1991).

Mediated Actions and Social Practices

In Vygotsky's (1935/1978) sociocultural orientation to learning, mediation is the key to guided participation and learning within apprenticeships (Lave & Wenger, 1991; Rogoff, 1995). Mediation is literally action with media, or tools that make the meanings in the cultural and material world more accessible and comprehensible (Wertsch, 1991). In an apprenticeship model, children learn ways of "doing and being" (Gee, 1999) by collaborating with peers or teachers who help them interpret signs and symbols to represent meanings that make sense within the cultural context. Children learn by participating in semiotic practices (e. g., drawing, coloring, pretending) with physical instruments (e. g., pencil, markers, forks, puppets) and media

(e.g., paper, toy sink, puppet stage) for crafting messages. The signs created by attaching shared meanings to these material objects are products of mediated actions. The term *mediated action* (Wertsch, 1991) recognizes that sign-making actions do not occur as isolated decontextualized behaviors, but rather as purposeful manipulation that meaningfully modifies materials and situations. Mediated actions make up *social practices*, categories of clustered mediated actions that have locally contextualized meanings (Scollon, 2001). For example, *loudly tapping a plastic fork* is a mediated action; whether it is interpreted as *making music*, *fixing the sink*, or *abusing classroom toys* depends upon which social practices are attached to the action, based upon the actor's intended meaning as well as the resources, rules, discourses, and roles that configure a local classroom community (Figure 1).

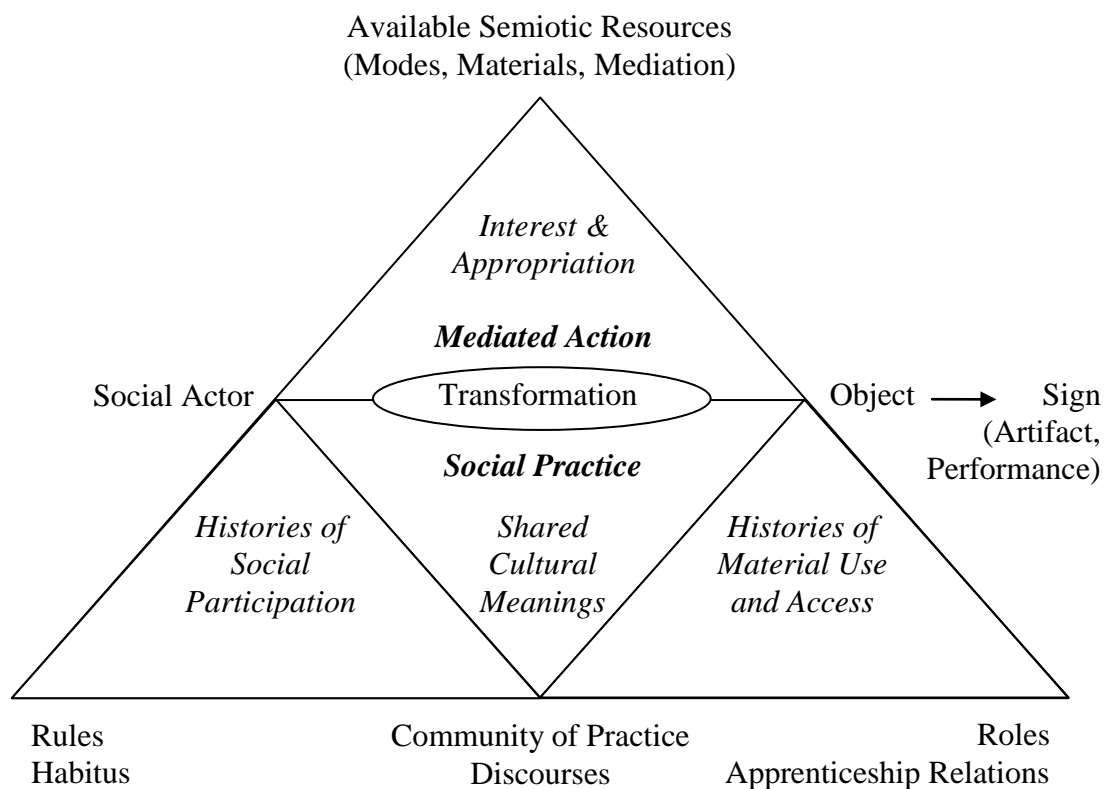


Figure 1. An Activity Model of Mediated Action and Social Practice

Motivated by Material Affordances and Designer Interest

The agency, economy, and materiality of playful design in the pipe-fixing pretense illustrates children's flexible approach to shared meaning-making, in and out of classroom events (Kress, 1997, 2003). The temporary and fluid nature of play allowed Daniel to pivot the fork's conventional function as eating utensil and recontextualize it to fit his changing purposes (Vygotsky, 1935/1978). Two forks turned into wrenches for loosening a pipe in this excerpt but a few minutes later, the forks were transformed again, this time into spatulas for flipping imaginary pancakes after the sink was fixed. "The real point about this voracious appetite for semiotic recycling is the child's ever-searching eye, guided by a precise sense of design, both for material and for shape" (Kress, 1997, p. 104). According to social semiotic theory (Hodge & Kress, 1988; Kress, 1997), signs are motivated by physical properties of the particular materials at hand; that is, the material properties of an object influence how well it will act as a signifier to best represent a signified meaning.

"Mode is used to refer to a regularised organised set of resources for meaning-making, including, image, gaze, gesture, movement, music, speech and sound-effect. Modes are broadly understood to be the effect of the work of culture in shaping material into resources for representation" (Kress, 2003, p. 1). Each mode and medium more aptly facilitates certain meanings over others by offering specific affordances. For example, drawing uses a visual mode and organizes space in a way that affords analytical classification or image displays that prompt "This is a..." captioning. Talking uses verbal and auditory modes and organizes time in a way that affords sequential narratives of changing action over time (Kress, 2009). When a sign is conveyed through several modes, the combination of modes amplifies and complicates its meaning. Children, less accustomed than adults to cultural expectations for 'proper' uses of materials, strategically combine modes to intensify meanings (Kress, 2003). For example,

masking tape is often used by adults in schools for attaching materials to painted walls. But Mitchell discovered alternative ways to use masking tape, including sticking it to his hair to amuse his friends, while creating a SpongeBob paper sack puppet. Children extend the semantic potential of their designs by transduction, fast-paced blending of forms into the best available mode: cutting out drawings to create a two-dimensional shape or taping papers to construct three-dimensional toys (Kress, 1997).

In social semiotics, (Hodge & Kress, 1988), signs are motivated by the sign-maker's social interest as well as the immediate semiotic resources. In this case, the sign *wrench* was motivated by Daniel's interest in performing adult roles and in recruiting Ayesha to support his play scenario as well as the physical aptness of the fork's shape for imitating a wrench. Pahl and Rowsell (2007) argue that a designer's interest is also shaped by habitus (Bourdieu, 1977). More than a social purpose that guides the selection of semiotic resources, interest taps into a storehouse of histories of identities, practices, and dispositions that become sedimented into an artifact during its production. Pahl's ethnographic research analyzed children's artifacts for layers of identities, social practices, and dispositions learned at home and school. For one child, making a bird from tissue paper layered his knowledge of chickens on his family's farm in rural Turkey, a pet name that his mother had for him, a teacher's reading of *The Ugly Duckling*, and a prior bird-making craft activity at school. His hand-made bird bore traces of these histories as well as the immediate practices used to fabricate the tissue paper craft. This reconceptualization of artifacts as identity texts recognizes children's designs—drawings, crafts, and art projects—as literacy objects that can be read as layered assemblages of meanings, modes, practices, histories, and discourses. For example, Daniel's fork-turned-wrench enhanced his immediate performance of plumbing pretense but also drew upon a “do-it-yourself” discourse and knowledge of pipe-

fixing practices in his habitus developed through prior histories with adults engaged in household repairs.

Modes manifest interest when certain ways of combining voice, gaze, and handling objects are expected and tacitly-valued in the designer's habitus. Examination of uses of particular modes in valued practices can reveal how combinations of actions, talk, gesture, etc. create naturalized ways of participating that automatically elicit cooperation of others (Scollon, 2001). In this case, posture, talk, and the mediated action of tapping on metal faucets with plastic forks prompted Ayesha to recognize this instance of socio-dramatic play as pretended sink repair and to join in the with a fork/wrench of her own.

Situated in Classroom Social Relationships and Global Discourses of Childhood

It is not enough to access, use, and exploit multimodal resources; it is also necessary to get one's performance and use of materials recognized as a valid way of belonging within discourses that shape classroom apprenticeships and school cultures. Discourses are socially expected patterns of "using language, other symbolic expressions, and 'artifacts,' of thinking, feeling, believing, valuing, and acting that can be used to identify oneself as a member" in a global community (Gee, 1996, p. 131). Educational discourses in early childhood classrooms include skills mastery, developmentally appropriate practice, and in some classrooms, multimodality (Wohlwend, 2009a). The discourses and practices associated with *skills mastery* (NCLB, 2002) stress the necessity of meeting skill benchmarks and standardized testing targets. The discourses and practices associated with *developmentally appropriate practice* (c.f., Bredekamp & Copple, 1997) that stress children's need for exploration and learner-directed curricula. The discourses and practices associated with multimodal (Kress, 2003) approaches to learning stress emerging technologies and learner strategic design.

Of course, these discursive perspectives overlap and blur in lived classrooms where administrative mandates focus on skills mastery, early childhood teachers advocate for developmentally appropriate practice, and children bring popular media to school in SpongeBob backpacks. Conflicting and competing discourses can also produce tensions at the classroom level such as tensions between developmentally appropriate and skills mastery perspectives. Early childhood professional organizations circulate developmentally appropriate discourses and practices through teacher education literature that promotes an active, play-based, child-centered curriculum (Paley, 2004). Early childhood teachers are expected to nurture the whole child—intellectually, emotionally, physically, socially—by providing plentiful opportunities to play in a stimulating environment that prompts children to engage in exploration. In contrast, federal and state governments circulate skills mastery discourses and practices through accountability mandates, achievement benchmarks, and annual standardized testing (Albright & Luke, 2008). However, this approach exemplifies developmentally “inappropriate practice” (Bredekamp & Copple, 1997, p. 72), a term used to critique lessons that push young children prematurely into the paper-and-pencil seatwork of formal schooling.

Each educational perspective favors particular modes for sign-making. The modes that are privileged in curricular activity serve as tangible markers that reveal the educational discourses circulating in a particular classroom. For example, a skills mastery perspective privileges print media and verbal modes (e.g., naming letters in flashcard drills, filling in math equation worksheets). The model of developmentally appropriate practice privileges action modes (e.g., focusing on the processes of play and exploration in dabbing paint on paper rather than the finished painting). A multimodal perspective on young children’s learning privileges multimedia and visual and action modes (e.g., art projects, play performances, computer

interaction). In this way, multimodal signs are situated in tensions among multiple discourses associated with their constituent modes.

The conflation and intersection of Discourses become modalities in texts, which, alongside practices, provide a formative picture of the meaning makers—not only their pathway into literacy but also how they make meaning in certain contexts and engage in practice. (Rowsell & Pahl, 2007, p. 392)

In the kindergarten in this chapter, children’s multimodal activity drew from, and was interpreted according to, educational discourses that made particular modes and media available and determined whether multimodal interaction constituted valued school practices.

Table 1. A Few Educational Perspectives on Early Childhood Learning

Perspective	Discourses and How They Circulate	Practices that Count as Learning	Valued Modes
Skills Mastery	Circulated through government mandates for accountability and standardization that require demonstrations of skill competency and displays of content knowledge	Remembering and reproducing correct responses on standardized tests and school tasks to meet benchmarks and rubric criteria	Print
Developmental	Circulated through developmentally appropriate models that value learner-directed exploration and children’s intention to create social messages	Repeated hypothesizing in a natural progression toward conventional forms	Action
Multimodal	Circulated through social semiotics view of sign-making as motivated by the aptness of available resources and the child’s social interest	Reading and producing signs that strategically combine varied modes in multimedia: drawings, music, play, popular media, and digital forms	Interacting multiple modes: image, print, sound, action, etc.

Methods for Analyzing Multimodal Interaction

During three school years, I observed, photographed, and analyzed the physical environment and play activity in eight classrooms in three schools that were recommended by

knowledgeable informants (principals, professors, teacher mentors). I conducted pilot studies in two of the kindergarten classrooms to develop a sense of each teacher's learning environment, to strengthen my ability to conduct fieldwork in these sites, and to work through technological issues in video- and audio-recording. I conducted preliminary critical discourse analysis to explore interpretations of children's work and play by having teachers view, categorize, and discuss videotaped instances of classroom activity. Next, I returned to this set of data and compared these kindergarten classrooms to generate specific criteria and identify one classroom for more intensive study. I analyzed the ethnographic data using classroom environment surveys (Wolfersberger, Reutzel, Sudweeks, & Fawson, 2004; Loughlin & Martin, 1987) to examine the physical products, tools, and material objects actually used by the children in the selected classrooms, looking particularly for evidence of child-directed design and play.

After locating a play-rich site, I visited the selected classroom approximately once a week during school year. The kindergarten with 1 teacher and 18 students was located in a K-6 public school in a university community in a rural midwestern state. Visits lasted from two to three hours, primarily during the mornings during play-integrated periods. The 5- and 6-year-old children in this class read, wrote, drew, colored, cut, pasted, and played throughout the morning-long literacy block. Following shared reading of big books and poetry charts, children worked on self-selected projects during three consecutive 45-minute activity periods—literacy choices, writers' workshop, and choice time centers—separated by short class meetings to share projects and always, to listen to a story.

While Daniel and Ayesha most often choose to play school in the class meeting area or enact family scenes in the housekeeping corner, another group of children chose to draw pictures and construct paper toys or projects at the art table. Mitchell, Jack, Stephen, and four other boys

regularly chose to sit together to “make stuff”, creating two-dimensional images of sports events, team logos, and popular culture characters and three-dimensional objects by folding, cutting, and gluing paper, cardboard, fabric scraps, yarn, and a variety of recycled materials. All the boys in this group were blonde, wore t-shirts in the local university’s colors, played soccer together at recess, and talked about team sports as they coached each other on art projects. I coded this group as “Just Guys” because they often denied that the puppets, paper airplanes, or light sabers that they produced held a particular meaning, characterizing their products as “just a design” and their practices as “just drawin’ somethin’” or “just playin’ around.” However, as the multimodal analysis in the next section suggests, the boys did more than “play around”: their play and design replaced teacher mediation with exploratory play and peer competition, created a school-sanctioned space for engaging popular media, and maintained a hierarchy of design mentoring relationships among the boys in this play group³. When Just Guys did attach meanings to their creations, they often drew favorite popular culture characters such as Ninja Turtles, Spiderman, Darth Vader, or SpongeBob Squarepants as they coached each other on art projects.

Data Collection

Analysis of multimodal interaction required copious data collection using video technology supplemented by ethnographic methods and multiple filters to locate key instances of play and design for microanalysis (for a discussion of video data collection for multimodal analysis, see Jewitt, 2006). As a participant-observer, I observed and videotaped children as they played, participating in projects as necessary in a classroom where children looked to adults for help. I documented my observations through a mix of data sources including fieldnotes, digital photographs, audiotapes, videotapes, classroom maps, and lists of the constantly changing

³ The boys’ design cooperation and competition also produced gender exclusion and peer group cohesion. A discussion that situates this group in gender and sports fan discourses is the focus of another article (Wohlwend, 2008).

collection of children's books and print on the walls of the classroom. I also consulted my collection of teacher/researcher emails, parent newsletters, and notes from informal interviews with the classroom teacher. A digital research portfolio housed data from all these sources along with organizational spreadsheets that cataloged data and documented analysis decisions and coding revisions. This electronic portfolio consisted of folders of electronic data, diagrams of coding schemes, expanded fieldnotes, an audio research journal, and coding reports and spreadsheets. The computerized nature of this portfolio also provided a mechanism for organizing digital data from the study such as audio files of children at play and jpeg photographs of student work that I photographed and immediately returned to the children. One spreadsheet chronicled coding progress and evolution, creating a record of the rationale behind each coding revision, tracking choices I had made that affected patterns in the analysis and making my assumptions visible and traceable. An overarching organizational spreadsheet in the portfolio cataloged data sources as well as data summaries for each session. The research portfolio became the place to deposit emerging theories, to look up previous interpretations, and to question assumptions against developing data patterns.

Data Analysis

Issues of transcription. One of the challenges in multimodal analysis is recording the variety of modes that can interact within a single event, including auditory modes (spoken language, music), visual modes (gaze, print, image), action modes (posture, facial expression, object handling, gesture, touch) and environmental modes: (proxemics [near/far relationships], layout). Researchers have responded to this challenge in a variety of ways, including action-enhanced transcripts and timelines (Ochs, 1999; Nelson, Hull, & Roche-Smith, 2008) and speech- and action-enhanced images (Norris, 2004).

Action-enhanced transcripts. Discourse analysts have developed a variety of transcription formats to include action and context (Bloome, Carter, Christian, Otto, & Shuart-Faris, 2004). One approach uses a matrix in which each row represents a turn of talk with description of action and context in the first column followed by transcribed speech in the second column (Ochs, 1999). Another approach captures video data using a timeline format similar to film-editing software with separate synchronous strips for different modes: one strip contains still video images (frames) captured at specified intervals, one strip contains transcribed audio for each frame, and another strip contains pertinent information from transcribed interviews with participants (Nelson, Hull, & Roche-Smith, 2008, p. 428). Frame interval transcription chunks activity into slices of uniform time slots that correspond with utterances (transcribed turns of talk) represented by freeze frames of video. A video is a representation of both time and space (Kress, 2009): a linear text that can be examined as a sequence of frames with images spatially-related actors and objects. Each frame depicts a slice of time-space and changes in spatial position across frames produce (a representation of) action. Matrix and frame interval transcription enables linear sequential readings in action-enhanced formats that mimic the linearity of spoken language, supporting analysis that assumes action and space are made meaningful and social through verbal language.

Speech- and action-enhanced images. However, spatial relationships, action and environmental modes do not map neatly onto utterances or time interval segments. Norris (2004) addresses this issue by representing activity through a multiple frame image that captures changes in actions or posture with transcribed speech flowing across frames and movement, posture, and gesture depicted through directional arrows. This method privileges movement across spatial arrangements over changes in verbal sequences, reflecting an analytic assumption

that meanings are also communicated spatially by proximity, direction, and relationships between actors, objects, and nonverbal modes.

Mapping modal relationships. I argue that analytic tools that use linear transcription formats privilege temporality and are based on a logic of change over time that underlies a view of sequential orderly learning. This chapter explores alternative formats that privilege spatiality, mapping the interplay of semiotic resources within social spaces to support a view of learning as complex coordination of repertoires of semiotic resources and participatory relationships. Semiotic resources and participatory relationships can be mapped by examining how modes segment spaces (boundaries), vary in visibility (perspectives, foregrounding and backgrounding), and interact as modal density (complexity and intensity) (Norris, 2004; Scollon, 2001, Scollon & Scollon, 2003; Wohlwend, 2009b). Analysis of interaction among modes uncovers the ways that social interactions unfold in a nonlinear fashion, involving complex and simultaneous coordination. Even in practices where a particular mode dominates, backgrounded modes produce resonances and tensions with the foregrounded mode in ways that complicate seemingly straightforward interactions. “Instead of viewing social actors as performing one-thing-at-a-time, this framework demonstrates that individuals perform many [mediated] actions simultaneously by attending to them to different degrees” (Norris, 2006, p. 402).

Mapping the interplay of modes uncovers power relations and social effects visible at the level of modes. Modal density explains how relationships among modes produces social effects through modal intensity or complexity (Norris, 2004). A mode has modal intensity when it is highly foregrounded in an event (e.g, the mode of speech when pretending to talk on the telephone in the play kitchen). Modal complexity occurs when a mode is intricately intertwined with other modes (e.g., talking to a friend while lying inside a kitchen cabinet and tapping on a

faucet with a fork when pretending to fix the sink requires coordinating multiple verbal, action, and visual modes). Norris (2006) closely examines events to determine modal density, suggesting that practices that are modally dense are more socially relevant because they require actors to coordinate resources and attention while carrying out an activity. In this chapter, I adapt Norris' transcription methods and concept of modal density to critically examine power relations constructed through children's manipulation of modes in the process of designing a paper sack puppet. In the following excerpt, Mitchell draws and colors with markers and cuts strips of tape to construct a SpongeBob hand puppet. This puppet-making activity required Mitchell to coordinate multiple modes; the mode of object handling was especially dense with multiple mediated actions (drawing, coloring, cutting, affixing) with varied media (paper, markers, scissors, masking tape). As Mitchell made a SpongeBob paper puppet, he exercised his own social interest in drawing a favorite media character while dodging school expectations for written work. Multimodal analysis of the vignette shows how Mitchell juggled multiple modes to produce the puppet but also to navigate tensions among schooling discourses and to cordon off social space for his popular culture interests.

Constructing Space and SpongeBob

Mitchell, Stephen, and Jack are seated at their favorite spots at the art table, which is almost completely covered with papers that spill out of Mitchell's writing folder. A large makeshift screen, improvised from a cardboard shadow puppet theater, blocks off the end of the table to Mitchell's right. Stephen sits behind this screen, completing letter recognition tasks under the watchful eye of Mrs. Hansen, the teacher's aide who monitors and assists him. The screen and individual aide are new additions to the art table: accommodations prescribed by a resource teacher to reduce distractions and keep Stephen "on task." The three boys are accustomed to helping each other design and construct their art projects and from time to time, Stephen and Mitchell peek around the screen to comment on each

other's work. Jack who sits across the table from Mitchell, carefully fills a blank sheet of paper with columns of addition equations but stops now and then to comment on the SpongeBob puppet that Mitchell is making.

Mitchell positions a pair of scissors in one hand, using his chest to steady the scissors as he puts his fingers in the grips. Cradling a roll of masking tape under his arm, he takes his fingers out of the grips of the scissors and uses both hands to open the blades with a jerk. Mitchell repositions his fingers in the scissors, unwinds about 5 inches of tape, clips off a 3-inch piece of tape, and sets the scissors on the table. The tape curls and twists back on itself and Mitchell cannot straighten out the tape strip. Mitchell attaches a sticky-side-out tape loop to the left top corner of the paper on the table in front of him, flattening it down with his fingers.

This was the first of nine cutting actions as Mitchell tried out multiple techniques for clipping off strips of masking tape in the process of constructing a SpongeBob sack puppet. Mitchell spent 15 minutes cutting and affixing strips of tape as he experimented to discover the properties of adhesive materials as he created a SpongeBob “practice puppet—just for fun,” which he characterized as a test case for a real puppet that he might make at some future time. Before he finished his practice puppet, Mitchell tried out multiple techniques for cutting tape strips as he developed his ability to operate tape and scissors. He also experimented with the material affordances of masking tape: he discovered its water-resistance that protected the paper from the red water-based marker and its ability to adhere well to various surfaces, including his own hair.

Not surprisingly, handling scissors was the most prominent action in Mitchell's puppet design activity; cutting strips of tape by manipulating the scissors and masking tape roll took most of Mitchell's time and attention (Figure 3 & Table 2). The dominance of cutting actions produced modal intensity, demonstrating the importance that Mitchell attached to this activity,

albeit his claim that he was just “playing around”.

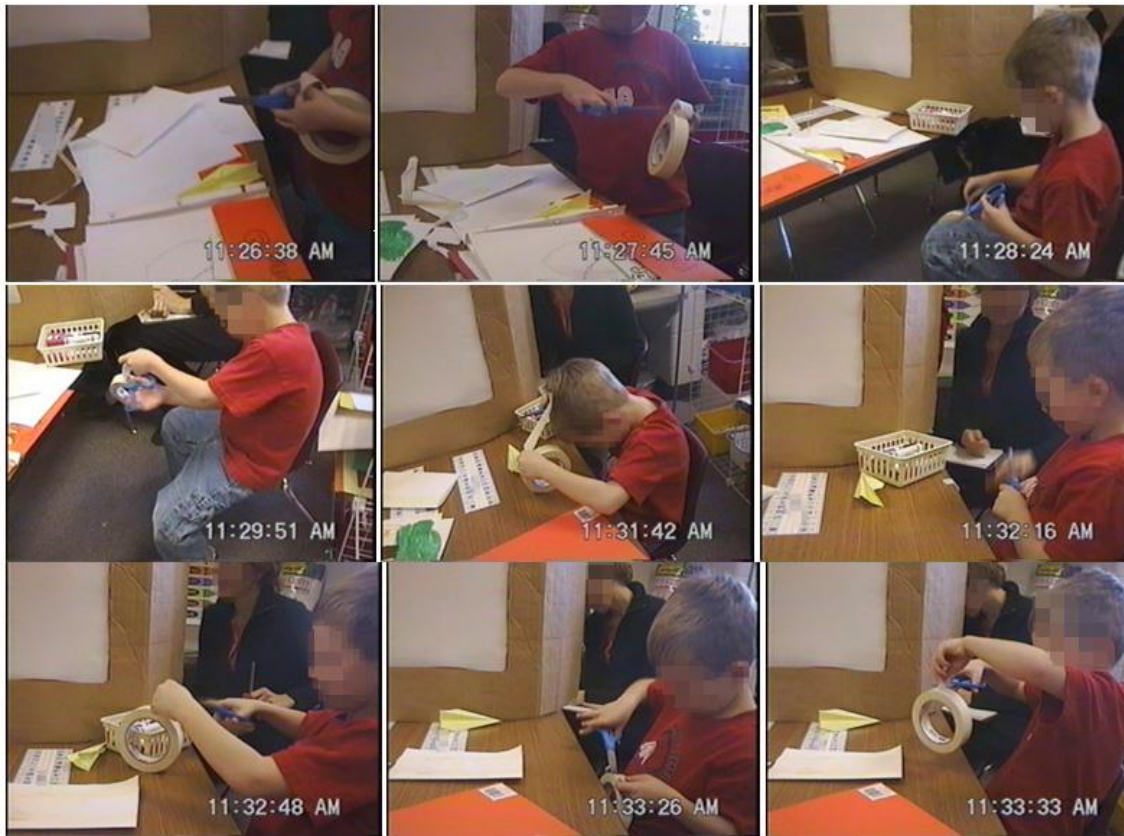


Figure 3. Modal Intensity: Cutting as Dominant Mediated Action
(Pictures should be read left to right.)

Table 2. Description of Cutting Mediated Actions in Context

Mediated Action	Description of Action in Context
Cut 1 (Top left image in Fig. 1)	Mitchell unwinds about 5 inches of tape and clips off a 3-inch piece of tape, and sets the scissors on the table. The tape curls and twists back on itself and Mitchell cannot straighten out the tape strip. Mitchell attaches a sticky-side-out tape loop to the left top corner of the paper on the table in front of him, flattening it down with his fingers.
Cut 2	Mitchell turns the wheel of tape, finds the end, and peels back another 3-inch strip of tape. This time, Mitchell cuts the tape strip close to place where the tape leaves the roll. Mitchell

	attaches the tape sticky-side-down to his paper below the tape loop and smoothes the piece of tape with his hands so that it lies flat on the paper.
Cut 3	Mitchell unrolls another strip of tape, this time placing the tape roll between his knees to steady the tape as he pulls back a 2" strip and clips it off, but it twists and sticks to the scissors.
Cut 4	Mitchell uses his newly invented method of holding the tape roll between his knees to cut another piece of tape. This time he pins down the tape with his thumb so that it doesn't tangle. Holding the scissors in his right hand, Mitchell pulls tape away from roll with his left hand. He suspends the roll by the strip of tape. Mitchell lifts the tape and tries to cut the tape with the scissor blades perpendicular to the tape edges but the blades of the scissors pinch the sticky edges of the tape together. Mitchell pulls the scissors back so that the edges unstick, causing the tape roll to twist back and forth. Mitchell stands up and holds the tape edge in one hand with the tape roll hanging free. He cuts the tape but this time, positions the blades parallel to the tape surface, allowing a clean cut. The tape roll drops upright on the table with a plop. Mitchell smiles and sings a wordless tune, the Stars Wars theme, "ERRerrerrerrerr-err-ERRRRRR-err. ERR-errerr-ERRRRRR-err," as he smoothes the final piece of tape on the paper, attaching a second column of tape to his paper.
Attempted Cut 5	Mitchell picks up the tape again and unwinds the longest piece of tape yet, about 7 inches. The end of the tape immediately curls back upon itself and Mitchell tries to untangle it. He announces, "I always draw. Even I play on my computer." Mitchell holds up tape and watches as the roll swings and twirls. He bends his head forward against the exposed sticky side of the tape strip. The tape adheres to his hair from his crown to his hairline. The tape roll bounces against his forehead and Mitchell smiles. He picks up the scissors to cut the tape against his forehead, changes his mind and begins pulling off the tape. The tape pulls at his hair as he removes it. "Ow. Ow, ow, ow, ow, ow."

Cut 6	<p>Pulling the tape completely free, Mitchell sits up, glances at the nearby teacher associate, looks at me and grins, “A::h-ow::::.” Still holding the scissors, Mitchell inspects the tape strip that he just pulled off his hair. He explains, “I wanted it to do that. 'Cause you know why? I wanted to get a scissors rip.” Mitchell puts the tape close to his head speculatively, “Hey, I need to do that again.” Mitchell wraps the tape around his wrist. It sticks tightly and the remaining tape strip and tape roll dangle from his arm. Mitchell tugs on the roll. “Now I’ll do it on my arm. It doesn’t even hurt.” The tape pops free and Mitchell holds the roll in his hand. “Ya know that, why?” Mitchell attaches the tape to the table edge; now the teacher associate steadies the roll of tap as he clips off a short piece of tape. Next, Mitchell takes a 4" piece of tape and attaches one end to the left column of tape on his paper. He repositions it several times before smoothing it on top of the existing column. “I’m gonna see--Aw::::::”</p>
Cut 7	<p>He clips another strip of tape by resting the roll vertically on the table, holding the tape strip in one hand and cutting with the other. Mitchell attaches the strip of tape horizontally across the two columns, creating an “H” out of masking tape.</p>
Cut 8	<p>Mitchell picks up the tape roll and wedges it between his chest and the table ledge. He pulls out an inch of tape and sticks it to the back of his left hand which rests on the top of the roll of tape. He holds the scissors in his right hand. “I’m putting it on my lit-tle hand.” He positions his right hand in the scissors, then removes his hand to use both hands to open the blades. He tries cutting at a perpendicular angle again but stops short before he closes the scissor blades.</p>
Cut 9	<p>Mitchell picks up the tape roll by the leading tape strip. Holding it above the table, he cuts at an angle parallel to the tape surface and snips off the tape, letting the tape roll fall to the table. “Cut! Phew!”</p>

The entire episode lasted 14 minutes and 5 seconds, beginning at 11:26:38 in the first

frame in Figure 3 and ending at 11:40:43 in the last frame in Figure 4. Cutting tape took 6 minutes and 55 seconds or 49% of the total time, drawing took 18%, coloring took 17%, smudging took 5%, and peeling tape took 9% (Table 3). Although cutting consumed the most time, it was not the only mediated action in Mitchell's handling of objects. Making the puppet required coordination of multiple mediated actions with many art tools: sticking, smoothing, and peeling tape; drawing, coloring, and smudging with markers on paper (Figure 4).

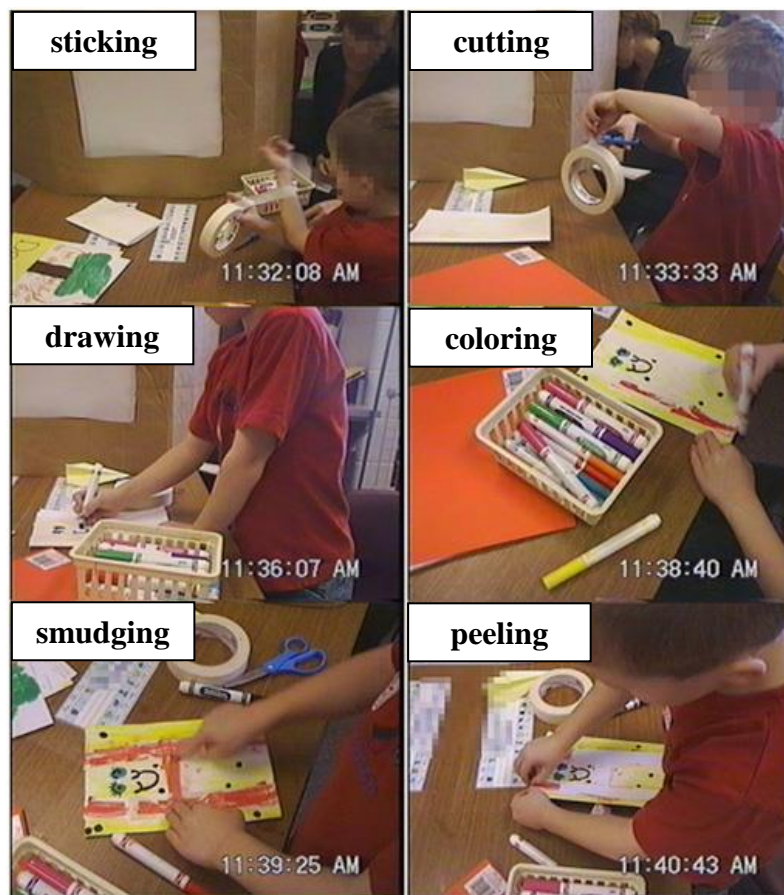


Figure 4. Modal Complexity: Coordinating Various Mediated Actions to Make a Puppet
(Pictures should be read left to right.)

Table 3. Description of Various Mediated Actions in Context in Puppet Construction

Mediated Action	Description of Action in Context
Drawing	Having finished cutting the tape, Mitchell concentrates on drawing eyes and a mouth

	on the puppet.
Coloring	Mitchell colors SpongeBob with a yellow water color marker and then experiments, using a red water color marker to cover the tape's water resistant surface.
Smudging	Mitchell drags an index finger across the wet watercolor, and inspects the pinkish smudge that results. Mitchell continues to smudge the tape until the entire surface of the tape is pink instead of red. "I'm just playing around. I'm just pre- I'm just play, playing around so, so I could draw SpongeBob."
Peeling	Mitchell discovers the masking function of the tape as he peels a corner of the tape away from the puppet leaving a white space where the reddish tape had been. He continues to peel off tape, holding the puppet down with his left hand while peeling with his right. A passing child asks, "Why you ripping that off?" "Because, so, so I will want to know what it looks like. Who:::a. I [xxx] go looking 'at good. Hey!
Sticking	As flickering lights signal cleanup, Mitchell shakes tape off his finger onto the table. "Get here. Ack." He peels the last piece off the puppet but it catches the edge of the paper and starts to rip the paper. Short on time, he decides to stop, leaving the last piece of tape on the top right corner still attached. "That's ok. I'll just leave it."

Mapping Modal Density

Close examination shows that object handling-was most relevant in this activity. The modal intensity of this mode in the puppet-making activity increased as Mitchell attended closely to managing scissors as he learned to cut and place the sticky tape. Mitchell's coordination of multiple mediated actions created modal complexity as his mediated actions interacted with other modes such as gaze, speech, movement and posture: as Mitchell gazed at his drawing of the SpongeBob image, he chatted with others, moved around the table to get materials, and changed posture as he stood up, bent over to pick up the tape, and leaned back in his chair.

Figure 2 shows a mapping of modes within the production of the SpongeBob puppet. The number of overlapping circles indicates the modal complexity of the event and the size of an individual circle represents each mode's modal intensity. The large size and central placement of the action mode of object handling indicates its high modal intensity and its foregrounding during puppet construction; in other words, Mitchell's attention was highly focused on cutting masking tape. The large number of circles surrounding the object handling mode indicates the modal complexity of this event: Mitchell coordinated multiple modes as he combined practices: making an artifact, gazing at the puppet-in-progress, maintaining close proximity to other people at the table, navigating the layout of built environment to find more art supplies, changing his posture by standing and sitting at the table, and talking—all the while coordinating the mediated actions of cutting, coloring, and affixing tape. Each mode will be considered briefly in this section followed by a closer look that coordinates multiple modes in the next section.

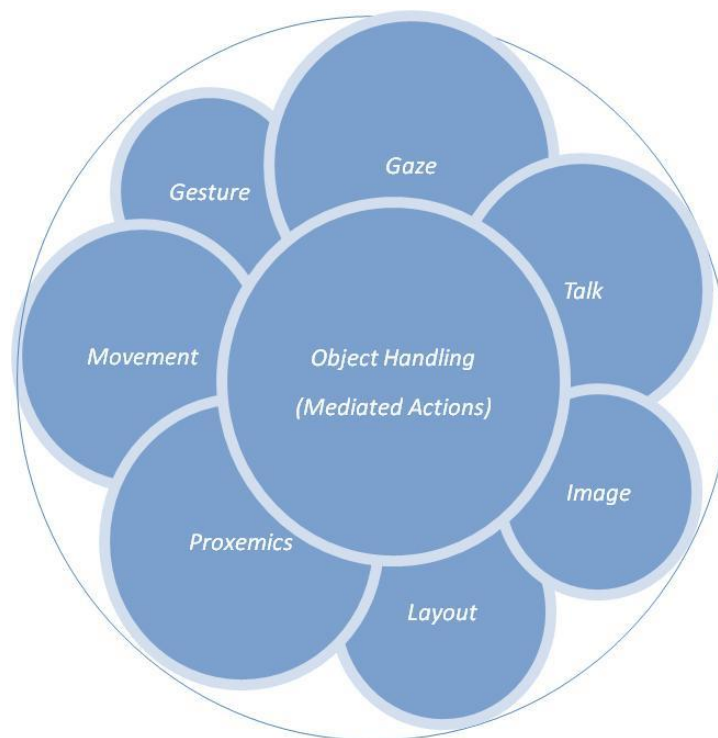


Figure 2. Modal Density in Puppet Design Activity

Image/artifact. The character that Mitchell chose for his puppet was SpongeBob Squarepants, a popular character with the Just Guys group and the main character on an animated television program that airs on the Nickelodeon cable network. The program features anomalies in the underwater adventures of SpongeBob, a cheerful, energetic sea sponge (who has the bright color and boxy shape of a yellow kitchen sponge). Mitchell exploited the rectangular shape of the paper bag puppet by coloring to the edge, pressing hard on a fresh marker to create a saturated yellow color (Figure 5). When Jack pointed out (twice) that SpongeBob's spots should be green, Mitchell ignored him and continued to color black dots on the yellow sponge. He colored the H-shaped masking tape suspenders red, dressing the character to represent a worker's overalls (varied occupational garb is a typical motif in SpongeBob licensed merchandise). But later, he peeled almost all the tape off, fascinated by the masking property of the tape.



Figure 5. Image: Mitchell's Finished SpongeBob puppet

Proxemics, posture, movement, gesture, and layout of built environment. Positioning of children, materials, and physical space influenced the children's interaction and reflected peer

relationships and educational discourses. Jack worked on math problems as he sat across from Mitchell at the art table and the boys maintained close proximity. Although the boys worked separately on unrelated projects, their history of collaborative mediation and their proximity allowed peer critique and mentoring. Proximity enabled shared gaze and talk, gesturing to each other's work, and created a bounded social space that limited access to their boys-only play group. Consistent with a developmentally appropriate perspective on early childhood education, children chose where to sit, decided which materials to use, and moved freely around the room. Mitchell stood as much as he sat, moving around the table, and around the room, getting paper and markers. Consistent with a multimodal approach to learning, the table's location next to the paper shelf allowed easy access to a rich supply of art materials including bins of markers, tapes, scissors, and papers. Free access to plentiful supplies manifested learner-agency in both educational discourses⁴. Most prominent in the physical layout, however, was the cardboard screen that isolated Stephen. The screen, combined with the close proximity and gaze of a supervising adult, concretized the practices associated with a skills mastery perspective by enforcing "on-task behavior": disrupting his proximity to other children at the table with the goal of limiting his gaze and talk and directing his attention to letter recognition skills tasks.

Gaze. Mitchell and Jack primarily focused on their own papers but when they occasionally glanced at each other's projects, they evaluated its quality. For example, Jack looked critically at Mitchell's puppet for its accuracy in depicting the correct colors of the SpongeBob character. Mitchell also showed his completed puppet to Mrs. Hansen and she watched him cut the tape strips. The screen prevented Stephen from gazing at others' work and thus decreased his

⁴ This analysis focuses on three educational discourses, overlooking the multiple discourses that circulate in any given place. For example, the plentiful and easily accessible supplies also convey an expectation to liberally consume material goods consistent with discourses of neoliberal consumerism. Further, the boys-only group drew upon discourses of masculinity and gendered models of sports fandom that played out in tensions between competition and cooperation as well as inclusive and exclusive peer group relations (See Wohlwend, 2008).

opportunities for collaboration and peer mediation. Despite this visual barrier, Mitchell did look behind the screen to coach Stephen on identifying the letter G (by singing the alphabet and stopping on the letter G). Stephen also stepped out from behind the screen once to comment on Mitchell's puppet.

It is important to note that my perspective as researcher determined the camera's perspective and the research gaze: where I aimed my camera created a frame of activity with a particular point of view and a foregrounded segment of space. Mitchell's gaze as subject is foregrounded here as a window into what he knows but it is my backgrounded gaze as the researcher that produces a knowable subject (Foucault, 1995).

Talk and singing. As noted in the previous sections, collaborative talk and singing accompanied Mitchell's puppet-making. Using the phrase of "just for practice," Mitchell created a space to explicitly "play around" and explore design tools as he created a practice puppet. The phrase "just for practice" suggests an aimlessness that protected his space from instructional oversight by nearby adults (teacher associate, researcher). An artifact created for practice is disposable, risk-free, and invites experimentation with techniques. Even so, Jack critiqued Mitchell's rendering of SpongeBob. The following instance was typical of the tension in Just Guys' competitive project critique and cooperative peer scaffolding.

Jack [looking at Mitchell's paper bag covered with masking tape H]: That doesn't look like SpongeBob. He has green dots.

Mitchell: [singing as he begins drawing SpongeBob's eyes] SpooongeBob.

Jack [louder]: He has green dots.

Mitchell: Black to me. [while searching through basket for black marker]

Jack: Hey, did you know $30 + 20$? 20 minus 10 is 10 . Get it? 10 plus 10 is 20 . If

you take away 10, 10. Get it?

Mitchell: If you take away 10, and then there will be 10!

Jack: It's funny, isn't it?

Mitchell: If you did a 10, then there will be 10. [slapping hand with marker for emphasis.] Get it?

Jack: Now, I got it.

This snippet of talk links to larger patterns of competition and cooperation among boys in this group. The Just Guys' ongoing peer coaching strengthened their group cohesion by acting and talking a space into being; that is, by discursively creating a place in the classroom for playing and designing their own projects. Jack's critique, "That doesn't look like SpongeBob. He has green dots," was typical of the evaluative comparisons the boys made in informal competition to determine who was "best draw-er." Mitchell's response, "Black to me," asserted his authority as designer to alter the color. Mitchell maintained his status as an expert designer among this group of boys by demonstrations of his skill with tools and claims of original designs ("I comed at this idea myself"). However, as this conversation reveals, their talk also supported Jack's writing of addition problems, allowed both boys to voice their emerging expertise with two-digit addition, and furthered the goals consistent with a skills mastery perspective in the midst activity closely aligned with multimodal and developmental perspectives. Clearly, Mitchell and Jack were interested in getting recognized as good students as well as good designers.

Linking Modal Density to Semiotic Repertoires and Discursive Participation

Semiotic Repertoires Layered in a SpongeBob Puppet

Mitchell expanded his repertoire of semiotic resources as he manipulated modes and honed his design practices to make this puppet. The SpongeBob puppet was a modally dense

artifact that acted as a durable text that represented the character's meanings (Brandt & Clinton, 2002) but it also concretized modes associated with Mitchell's design practices. Modal layers in the puppet sedimented verbal histories (remembered and invented storylines and dialogue for the SpongeBob character), its tactile and visual properties (smooth paper, bright colors, hand-sized structure), its past and future tool uses (prior designed use as a paper sack transformed into potential use as a hand puppet, realized uses of tape, scissors, and markers), mediated actions (object handling that increased Mitchell's cutting and taping knowledge and skill development), and its designer's social interest (making a "practice" puppet that enabled a temporary, transitional, "not real" state that legitimated playing around). The sedimented modes and the quality of the artifact's design provided tangible evidence of Mitchell's design skill that turned a paper puppet into a concrete marker of his identity as a master designer among the Just Guys. The layers in the puppet marked Mitchell's identity as an innovator and explorer, as a master kindergarten designer with advanced cutting and taping skills, as a peer mentor who would teach these skills to other kindergartners, as a fan of a cartoon series that features humor and parody of adults, and as a SpongeBob character animator and puppeteer.

Participation in Classroom Apprenticeships and Discourses of Schooling

In this classroom context, social positions reflected a hierarchy of power relations based on the children's relative design and academic skills within the classroom apprenticeship and within peer culture. In the classroom, design skills constituted cultural capital valued in kindergarten curricula and school habitus as evidence of fine motor skills, neatly crafted products, and an ability to work independently. Among Just Guys, Mitchell occupied a position as an innovative designer and an active mentor who often helped other boys copy one of his designs; in contrast, Jack was a competent designer who usually worked alone and critiqued but

rarely coached other children. Whether Just Guys created or copied designs, they used design practices for social purposes, developing and honing skills in order to compete and be recognized as group members. Due to school-mandated structures like the visual screen, Stephen had far fewer opportunities to develop design skills, limiting his participation in the Just Guys group. Ironically, the accommodations intended to help him to master skills limit his development of a more robust semiotic repertoire and his access to peer coaching.

In this kindergarten, developmental and multimodal perspectives ensured that playful exploration was valued and encouraged; however, in many time-crunched classrooms where skill mastery discourse dominates in this standards-driven era, playing around with design is discouraged or penalized as off-task behavior. In such classrooms, play and design only occurs in the cracks and crevices of the daily schedule, outside teacher surveillance. When one discourse overwhelms others, critical multimodal analysis can reveal who is disadvantaged and how this is accomplished through a gesture, a look, or the arrangement of furniture. A reconceptualization of learning as expansion of semiotic repertoires and discursive participation recognizes that children engage complicated mixes of meanings, modes, and practices through ordinary classroom materials and projects—even those created just for practice. Learning repertoires—including play and design practices—flexibly employ semiotic resources for their cultural meanings, physical properties, and design affordances to represent ideas but also to negotiate overlapping educational discourses and navigate classroom social spaces. Whether played or designed, the complexity of children’s interactions with plastic forks, paper sack puppets, and other multimodal texts suggests the need for multimodal analysis that closely examines artifacts in their sites of production and interpretation in order to read these sites for their layered assemblages of meanings, modes, practices, histories, and discourses.

The critical multimodal analysis described in this chapter offers a way to focus on particular aspects of the seemingly aimless and often chaotic activity of children's play and tease out discourses circulating in the background. This action-oriented approach to multimodal analysis differs from other approaches in three ways: 1) Many forms of social semiotic multimodal analysis focus on readings of images and artifacts for strategic uses of modes; critical multimodal analysis focuses on the unfolding of interactions in contexts. This is especially helpful when studying young children's play that is fleeting and gestural or their designs that fluidly morph from one idea to the next. 2) Some social semiotic analyses focus primarily on one mode in terms its modal grammars (e.g., reading images in terms of visual grammar and the layout of design elements); critical multimodal analysis focuses on multiple modes and the ways they interact to produce tensions, blurrings, and resonances. Early childhood classrooms are often busy, noisy, and wonderfully messy sites of modal interaction. 3) Finally, some forms of interactional analysis unpack modes to provide rich descriptions of communicative practices; critical multimodal analysis unpacks modes to reveal how modal interaction maps onto discursively-maintained power relations. In this way, tacit power relations that shape daily classroom activity are made visible and available for deconstruction.

Critical multimodal analysis of the modes in the SpongeBob episode revealed the ways that power relations and discourses kept Mitchell at the center and Stephen at the periphery of the classroom community. Mitchell was able to negotiate tensions between multimodal and developmental perspectives that enabled his design exploration and a skills mastery perspective that kept Stephen "on task" but prevented collaboration with the other boys. These tensions between educational discourses in early childhood classrooms are long-standing and incorrigible. Early childhood teachers find themselves squeezed "between a rock and a hard place"

(Goldstein, 1997) when their efforts to encourage multimodal learning in developmentally appropriate ways conflict with administrative mandates for scripted lessons, skills benchmarks, and testing targets. Faced with these dilemmas, teachers often feel personally responsible and question their own teaching ability rather than turning the lens back to question which institutions and groups benefit by competing educational discourses and practices. Elsewhere, I have argued that such dilemmas signal critical sites for teacher choice and agency that afford strategic shifts toward resistance and critique (Wohlwend, 2009a). A clear understanding of tensions across multiple perspectives could help teachers to see discourses as resources and to act strategically with greater awareness. Critical multimodal analysis provides a way for early childhood teachers to see how the tangible everyday aspects of familiar classroom activity matter; how playing plumber in the housekeeping corner or cutting tape for a paper sack puppet link to discourses and power relations that operate in the background; and how making small changes in the arrangement of furniture, in the availability of modes and media, and in daily classroom interactions could make a big difference in children's opportunities to learn.

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